

Federal State Autonomous Educational Institution of Higher Education  
«Peoples' Friendship University of Russia»

*Medical Institute*

Recommended MCSD

**SYLLABUS**  
(STUDY GUIDE)

**Subject**

**Fundamentals of Psychophysiology**

**Recommended for the direction of training (specialty)**

**31.05.01 General Medicine**

**Program (profile, specialization)**

**General Medicine**

## 1. Goals and objectives of the discipline.

**The goal** - the acquisition of the student's knowledge of the physiological mechanisms of mental processes at the membrane level, synapses, neurons, the nerve centers and the central nervous system.

### Discipline objectives:

- Formation of students' professional and general cultural competence in matters of structural and functional organization of the main psychophysiological processes in ontogenesis.
- Training in the basics of psychophysiological examination techniques, as well as the analysis and interpretation of the results obtained.
- Formation of basic knowledge about the physiological mechanisms of emotions, thinking and speech.
- Formation of skills in the study and use of scientific literature and official statistical reviews.

## 2. Place of discipline in the structure of EP HE:

Discipline "Fundamentals of Psychophysiology" refers to the variable part of the block number 1 of the curriculum.

Table 1 shows the previous and subsequent disciplines aimed at the formation of discipline competencies in accordance with the competence matrix of EP HE.

Table No. 1

### Prior and subsequent disciplines aimed at the formation of competencies

P / p No.	Code and name of competence	Preceding disciplines	Subsequent disciplines (groups of disciplines)
General professional competencies			
	OPK-5	Biology ; Anatomy " Histology, embryology, cytology ; Molecular genetics in practical biology and medicine	Pathophysiology, Clinical Pathophysiology ; Biotechnology; Medical rehabilitation; Dermatovenereology ; Neurology, medical genetics, neurosurgery; Occupational diseases; Faculty surgery; Endocrinology; Outpatient therapy; Urology; Obstetrics and gynecology; General surgery; Traumatology, Orthopedics; Pediatrics; Evidence-based medicine; Outpatient cardiology; Propedeutics of Internal Medicine ; General Surgery ; Occupational diseases ; Anesthesiology, resuscitation, intensive care

## 3. Requirements for the results of mastering the discipline:

The process of studying the discipline " Fundamentals of Psychophysiology " is aimed at the formation of the following competencies:

**Formed competencies**

Competencies	Competency name	Competence achievement indicators
GPC - 5	GPC-5. Being able to assess morpho-functional, physiological conditions and pathological processes in the human body to solve professional tasks	GPC-5.1. Mastering the algorithm of clinical, laboratory and functional diagnosis when dealing with professional tasks.  GPC-5.3. Being able to determine morpho-functional, physiological states and pathological processes of the human body.

**4. Scope of discipline and types of educational work**

The total complexity of discipline is **2 -goal units** .

Type of educational work <b>for full-time education</b>	Total hours	Semesters / module			
		3			
<b>Classroom lessons (total)</b>	<b>34</b>	<b>34</b>			
Including:					
<i>Lectures</i>					
<i>Practical lessons</i>					
<i>Seminars</i>	34	34			
<i>Seminars</i>					
<b>Independent work (total)</b>	<b>38</b>	<b>38</b>			
Total labor intensity hour	<b>72</b>	<b>72</b>			
WE	<b>2</b>	<b>2</b>			

**5. Content of the discipline****5.1. Contents of discipline sections**

N o. p/ p	The name of the discipline section	Section Contents

1.	Methods of psychophysiological research	Polygraphy. Pneumography. Plethysmography. GSR, electrooculography, electromyography, electrocardiography, electroencephalography (EEG). EEG spectral analysis. Evoked potentials. Computer mapping of the brain. Outside and intracellular registration of neuronal activity. X-ray computed tomography. Structural magnetic resonance imaging (MRI). Positron Emission Tomography (PET). Functional magnetic resonance imaging (fMRI). Video oculography .
2.	Basic approaches to the study of psychophysiological mechanisms	Systems approach in psychophysiology. Behavior. Functional system. Motivation. Memory. The purpose of the action. Advance reflection. Action acceptor. Action programming. Reinforcement. Reverse afferentation . Systemogenesis. Systemic specialization of neurons. Interaction of cognitive systems in purposeful behavior. The concept of the psyche. The origin and development of the psyche in phylogenesis. The problem of the qualitative uniqueness of the human psyche. The structure of the human psyche . The concept of the installation .
3.	Psychophysiology of emotions	Neuroanatomy of emotions. Biologically and socially significant stimuli as a source of emotions. Necessity and informational factors of the emergence of emotions. Cognitive processes in the genesis of emotions. Expression of emotions in animals and humans. Means of non-verbal, emotional communication. Correlation of facial muscle activity and emotions. Functional asymmetry and emotions. Individual differences and emotions. Influence of extraversion, introversion, anxiety. Reactivity of the cardiovascular system. Sexual differences in emotions. Centers of positive and negative emotions. Self-irritation. Limbic system. Central vegetative network. Theories of emotions .
4.	Psychophysiology of thinking and speech	Signaling systems according to I.P. Pavlov. Interaction of the first and second signaling systems. Symbolic display of stimulus. Development of speech. Perception of speech signals. The meaning and types of phonemes and their identification by psychophysiological methods. Wernicke Center. Oral speech. Generation of reactions of the second signaling system with the participation of command neurons: articulation, gestures, written signs. Broca's zone . Preparedness potential. Motor potential. Semantic evoked potential. Internal speech. Thinking as outwardly not expressed operations with traces of memory. Areas of brain activity and thinking. Functional asymmetry of the brain and features of intellectual activity. Verbal and non-verbal intelligence. The main provisions of the theory of activity of A.N. Leontyev. Needs, motives, emotions, personal meaning. The structure of human consciousness according to A.N. Leontiev. The concepts of individuality, temperament, character and personality.

5.	Principles of polygraphic examination (instrumental lie detection)	Theoretical foundations of instrumental "lie detection". The main methodological difficulties and errors arising in the course of polygraph examinations. Methods of countering a polygraph. General requirements for the compilation of a questionnaire for the printing industry. Classic methods and tests of polygraph checks, advantages and disadvantages. Methodological techniques of test questions technique. The use of the installation phenomenon in the practice of instrumental detection of lies. Using the features of cognitive processes (sensation, perception, attention, memory) in the practice of polygraph tests.
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## 5.2. Sections of disciplines and types of classes

P / p No.	The name of the section (topic) of the discipline	Seminars	CPC	Just an hour.
1.	Methods of psychophysiological research	10	8	18
2.	Basic approaches to the study of psychophysiological mechanisms	4	8	12
3.	Psychophysiology of emotions	6	8	14
4.	Psychophysiology of thinking and speech	6	8	14
5.	Principles of polygraphic examination (instrumental lie detection)	8	6	14
	<b>Total</b>	<b>34</b>	<b>38</b>	<b>72</b>

6. Laboratory studies are *not provided*.

## 7. Practical exercises (seminars)

P / p No.	The name of the discipline section	Name of practical classes ( seminars )	Labor intensity (hour.)
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1.	Methods of psychophysiological research	<p>1. Non- electriphysiological techniques in psychophysiology. Pneumography. Plethysmography. X-ray computed tomography. Structural magnetic resonance imaging (MRI). Positron Emission Tomography (PET). Functional magnetic resonance imaging (fMRI). I-tracking.</p> <p>2. Electrophysiological techniques: RAG, electrooculography, Elektromiografiya.</p> <p>3. Elektrokardiografiya. and the basics of vector analysis a.</p> <p>4. Electroencephalography (EEG) . Electrode placement diagrams (standard installations).</p> <p>5. About a rhythms EEG, age norms and differences. EEG in states: active, relaxed wakefulness, drowsiness , slow and REM sleep.</p> <p>6 . Spectral analysis of EEG and its application in psychophysiology.</p> <p>7. Interhemispheric asymmetry on the EEG.</p> <p>8. Evoked brain potentials recorded by an encephalograph . Averaging technique.</p> <p>9. On difference ga me visual, auditory x and somatosensory induced potentials. Computer mapping of the brain.</p> <p>10. Polygraphy</p>	10
2.	Basic approaches to the study of psychophysiological mechanisms	<p>1.Hierarchy of physiological processes in s in the central nervous system. Systems approach in psychophysiology. Behavior.</p> <p>2. Functional system. Motivation. Memory. The purpose of the action. Advance reflection. Action acceptor. Action programming. Reinforcement.</p> <p>3. Reverse afferentation. Systemogenesis. Systemic specialization of neurons.</p> <p>4. Interaction of cognitive systems in purposeful behavior.</p> <p>The concept of the psyche. The origin and development of the psyche in phylogenesis. The problem of the qualitative uniqueness of the human psyche. The structure of the human psyche.</p>	4

3.	Psychophysiology of emotions	<p>1. Theories of emotions. Neuroanatomy of emotions. Biologically and socially significant stimuli as a source of emotions. Necessity and informational factors of the emergence of emotions. Cognitive processes in the genesis of emotions.</p> <p>2. Expression of emotions in animals and humans. Means of non-verbal, emotional communication. Correlation of facial muscle activity and emotions. Functional asymmetry and emotions. Individual differences and emotions. Influence of extraversion, introversion, anxiety.</p> <p>3. Reactivity of the cardiovascular system. Sexual differences in emotions. Centers of positive and negative emotions. Self-irritation. Limbic system. Central vegetative network.</p>	6
4.	Psychophysiology of thinking and speech	<p>1. Signal systems according to I.P. Pavlov. Interaction of the first and second signaling systems. Symbolic display of stimulus. Development of speech. Perception of speech signals. The meaning and types of phonemes and their identification by psychophysiological methods. Wernicke Center. Oral speech. Generation of reactions of the second signaling system with the participation of command neurons: articulation, gestures, written signs. Broca's zone .</p> <p>2. Potential of readiness. Motor potential. Semantic evoked potential. Internal speech. Thinking as outwardly not expressed operations with traces of memory. Areas of brain activity and thinking. Functional asymmetry of the brain and features of intellectual activity. Verbal and non-verbal intelligence.</p> <p>3. The main provisions of the theory of activity of A.N. Leontyev. Needs, motives, emotions, personal meaning. The structure of human consciousness according to A.N. Leontiev. The concepts of individuality, temperament, character and personality.</p>	6

5.	Principles of polygraphic examination (instrumental lie detection)	<p>1. Theoretical foundations of instrumental "lie detection". The main methodological difficulties and errors that arise during polygraph examinations. Methods of countering the polygraph.</p> <p>2. General requirements for the compilation of a questionnaire for the printing industry. Classic methods and tests of polygraph checks, advantages and disadvantages. Methodological techniques of test questions technique. Using the phenomenon of attitude in the practice of instrumental detection of lies.</p> <p>3. Using the features of cognitive processes (sensation, perception, attention, memory) in the practice of polygraph tests.</p>	8
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## 8. Material and technical support of the discipline:

For classes, group and individual consultations, monitoring and intermediate certification, classrooms 114, 116 and 126 and a lecture hall are used, located at the address: Moscow, st. Miklukho-Maclay, 8.

**Technical supply:** 4 complex for laboratory work (BIOZHEZL) EEG analyzer monitor cerebral biopotential sensors set, PC.

Classroom equipment: a set of specialized furniture, chalk board; a projection screen, a multimedia projector, computers with software that allows showing slides and conducting a milestone and final survey, and multimedia projectors.

**Audiovisual Learning Tools:** Instructional films and files based on real-life research recordings. Educational computer programs used in practical classes: program for testing "Mytest".

## 9. Information support of the discipline

### a) software :

Volume Licensing Program (Microsoft Subscription) Enrollment for Education Solutions (EES) No. 56278518 dated 04/23/2019 (renewed annually, the program is assigned a new number).

### b) databases, information and reference and search systems:

1. EBS of RUDN University and third-party EBS to which students have access on the basis of concluded agreements:

- Electronic library system RUDN - EBS RUDN <http://lib.rudn.ru/MegaPro/Web>

- EBS "University Library Online"

<http://www.biblioclub.ru>

- EBS Yurayt <http://www.biblio-online.ru>

- EBS "Student Consultant" [www.studentlibrary.ru](http://www.studentlibrary.ru)

- EBS "Doe" <http://e.lanbook.com/>

- TUIS: <http://esystem.pfur.ru/course/view.php?id=46>

2. Database of medical and biological publications:

- NCBI: <https://p.360pubmed.com/pubmed/>

- **RUDN University Bulletin:** access mode from the RUDN University territory and remotely <http://journals.rudn.ru/>



- **Library Elibrary.ru:** access on IP-addresses of People's Friendship University of address: [http : //www.elibrary.ru/defaultx.asp](http://www.elibrary.ru/defaultx.asp)

- **ScienceDirect (ESD), " FreedomCollection ", "Cell Press" ID "Elsevier".** There is remote access to the database, access by IP-addresses of RUDN University (or remotely by individual login and password).

- **Google Academy (eng. Google Scholar )** - a free search engine for full texts of scientific publications of all formats and disciplines. Indexes full texts of scientific publications. Access mode: <https://scholar.google.ru/>

- **Scopus** - scientometric database of the publishing house " Elsevier ". There is remote access to the database.

Access by IP-addresses of RUDN University and remotely by login and password (Grant of the Ministry of Education and Science). Access mode: <http://www.scopus.com/>

- **Web of Science .** There is remote access to the database. Access to the platform is carried out by IP-addresses of the RUDN University or remotely. Remote access to WOS is activated without administrator intervention after registering on the platform from RUDN University <http://login.webofknowledge.com/>

## **10. Educational and methodological support of the discipline:**

### **a) main literature**

1. Nikolaeva E. Psychophysiology: a textbook for universities / E. Nikolaeva. - St. Petersburg: Peter, 2019 .-- 704 p. : ill. - (Textbook for universities). - ISBN 978-5-4461-0880-0: 1 549.50.

### **b) additional literature**

1. Krol . M . Psychophysiology: textbook / V.M. Krol, M.V. Viha . - Electronic text data. - M.: KnoRus , 2017 .-- 504 p. : ill. - ( Bachelor's degree ). - ISBN 978-5-406-03282-4 : 908.49.

[http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn\\_FindDoc&id=455516&idb=0](http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=455516&idb=0)

## **11. Methodical instructions for students on mastering the discipline "Fundamentals of psychophysiology "**

A seminar as a type of training is conducted in specially equipped training laboratories (classrooms). Duration - not less than one academic th hour and . The necessary structural elements of the seminar , in addition to the independent activities of the students, are instructing conducted by the teacher, as well as the organization of discussion of the results of the seminar .

Seminars are completed with tasks that can be reproductive, partly search and search in nature.

Tasks , bearing the reproductive character, distinguished by the fact that when they conduct training are detailed instructions that specify: purpose, explanation (theory, basic characteristics), equipment, machinery, materials and their characteristics, the execution order of tasks , tables, conclusions ( without wording), control questions, educational and special literature.

Tasks wearing partially exploratory in nature, characterized by the fact that when they are conducting training do not enjoy full instructions, they are not given a detailed algorithm for performing the necessary actions, and require students self-selection of ways to perform work in the instructional and reference literature.

When performing tasks of a search nature, students must solve a new task (problem), relying on their theoretical knowledge.

When planning laboratory work, the developer finds the optimal ratio of reproductive, partial prospecting and prospecting work in order to ensure a high level of intellectual activity.

Forms of organizing students during seminars : frontal, team and individual.

When organizing training all front form students perform at the same time a one on , and so on the same task .

At the command form of a one on , and so on the same task is performed by teams of 2-5 people.

With an individual form of organization, each student performs his own individual task.

To increase the efficiency of seminars , the following are carried out :

–preparation of collections of tasks, tasks and exercises;

–development of control and diagnostic materials (funds of appraisal funds);

–combination of individual and group forms of work.

Grades for completing assignments are taken into account as part of the current control of the student's knowledge, which is carried out at the expense of the time allotted by the working curriculum for the study of the discipline.

## **12. Fund of assessment tools for intermediate certification of students in the discipline " Fundamentals of Psychophysiology " .**

Materials for assessing the level of development of educational material discipline , " " Basics of Psychophysiology " , includes a list of competencies indicating the stages of their formation, the description and criteria of assessment of competencies at different stages of their formation, a description of assessment scales, standard control tasks, or other materials necessary for the assessment of knowledge, abilities, skills and (or) experience of activities, characterizing the stages of formation of competencies in the process of mastering the educational program, methodological materials defining the procedures for assessing knowledge, skills, skills and (or) experience of activities, characterizing the stages of formation of competencies, are developed in full and are available to students on the discipline page at the Tuis RUDN University.

The program was drawn up in accordance with the requirements of the Federal State Educational Standard of Higher Education.

### **Developers:**

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**Head of the program**

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